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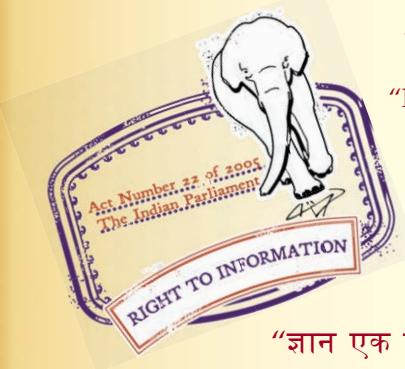
“Step Out From the Old to the New”

IS 8021 (1975): Dental Sticky Wax [MHD 8: Dentistry]

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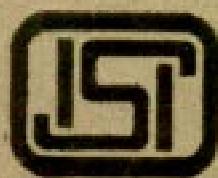


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IS : 8021 - 1975

Indian Standard
SPECIFICATION FOR
DENTAL STICKY WAX

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Indian Standard

SPECIFICATION FOR DENTAL STICKY WAX

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Indian Standard

SPECIFICATION FOR DENTAL STICKY WAX

0. F O R E W O R D

0.1 This Indian Standard was adopted by the Indian Standards Institution on 19 December 1975, after the draft finalized by the Dental Materials Sectional Committee had been approved by the Chemical Division Council.

0.2 Dental sticky wax is a blend of beeswax, colophony and other resins with additives which, when heated, melts and adheres closely to the surfaces to which it is applied. Its prime purpose is to hold components together prior to permanent fixation.

0.3 In the preparation of this standard, assistance has been derived from AS T : 10-1956 'Specification for dental sticky wax' published by the Standards Association of Australia.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for dental sticky wax, used for temporarily joining materials used in dental procedures.

2. REQUIREMENTS

2.1 Description — The wax shall consist of waxes and resins or other ingredients combined in proportions which will give a material which will be sticky when softened and which when applied to prosthetic materials, will adhere firmly when cool. The wax shall be free from deleterious materials and any defects which may impair its serviceability. No appreciable residue shall remain when the work on which the wax is used is flushed with boiling water.

*Rules for rounding off numerical values (*revised*).

2.2 Form and Size — The wax shall be supplied in the form of sticks of uniform size not less than 95 mm and not more than 105 mm in length and between 6 mm and 20 mm in diameter.

2.3 Flow — The plastic deformation (flow) of the wax determined in the manner described in A-1 shall be not more than 5 percent at a temperature of 30°C and not less than 90 percent at a temperature of 45°C.

2.4 Linear Shrinkage — The linear shrinkage of the wax determined in the manner described in A-2 shall not exceed 0·75 percent.

2.5 Non-volatile Residue — The melted wax when ignited at 500°C shall not leave residue in excess of 0·1 percent by mass, when tested in accordance with A-3.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in suitable containers as agreed to between the purchaser and the supplier.

3.2 Marking — Each container shall be securely closed and shall bear legibly and indelibly the following information:

- a) Name of the material;
- b) Name of the manufacturer and his recognized trade-mark, if any;
- c) Net mass;
- d) Batch number; and
- e) Date of manufacture.

3.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in Appendix B or as agreed to between the purchaser and the supplier.

APPENDIX A

(Clauses 2.3, 2.4 and 2.5)

METHODS OF TEST FOR DENTAL STICKY WAX

A-1. DETERMINATION OF FLOW

A-1.1 Apparatus

A-1.1.1 Micrometer Caliper

A-1.1.2 Flow Testing Instrument — The flow testing instrument (shown in Fig. 1) consists of a metallic cylinder *A*, a non-conducting shaft *B* and a brass plate *C*. The total mass in air of the three components is 2 000 g. The cylinder *A* shall be separated from the plate *C* on the shaft *B* by a minimum distance of 75 mm. The shaft shall be of hard rubber or a similar poor thermal conductor to avoid loss of heat due to conduction. The diameter of the brass plate which touches the test specimen shall be not less than 50 mm. The thickness of the plate shall not exceed 6·5 mm.

A-1.1.3 Mould — As shown in Fig. 2, consisting of a stainless steel plate 6·0 mm thick, having flat parallel top and bottom surfaces, and containing four holes, each 10·0 mm in diameter. The axes of the holes shall be perpendicular to the surfaces of the plate. The sides of the holes should be finished smooth.

A-1.2 Preparation of Test Specimens — Break a quantity of wax into pieces and place in an iron crucible of 50 ml capacity. Place the crucible on a surface which is 130 mm below a 250 W infra-red lamp. Allow the wax, while being stirred, to melt and maintain at this temperature until the sample is melted throughout. Use a thermometer to measure the temperature. Then pour the melted wax into the mould that has been lubricated with a silicone grease whose melting point is higher than 80°C. Preheat the mould to $55 \pm 5^\circ\text{C}$ and place on a smooth glass slab (150 mm long, 75 mm wide and 20 mm thick) also preheated to the same temperature. As the wax solidifies and a shrinkage void appears, add more of the melted wax. When the wax has lost its mirror-like surface, place on top of the mould a smooth flat tin-foil or aluminium-foil covered glass plate preheated to $55 \pm 5^\circ\text{C}$. Apply a load of 90 N (9 kgf) to the top of the foil-covered glass plate for 30 minutes. Then remove the load and the glass plate and trim away the excess wax by drawing a straight-edged metal scraper across the mould thereby trimming the specimen flush with the surface. Remove the mould from the glass plate by gently tapping the side of the mould. Remove the specimens of wax from the mould by chilling in water at 10°C and then store at $27 \pm 2^\circ\text{C}$ for 24 hours before testing.

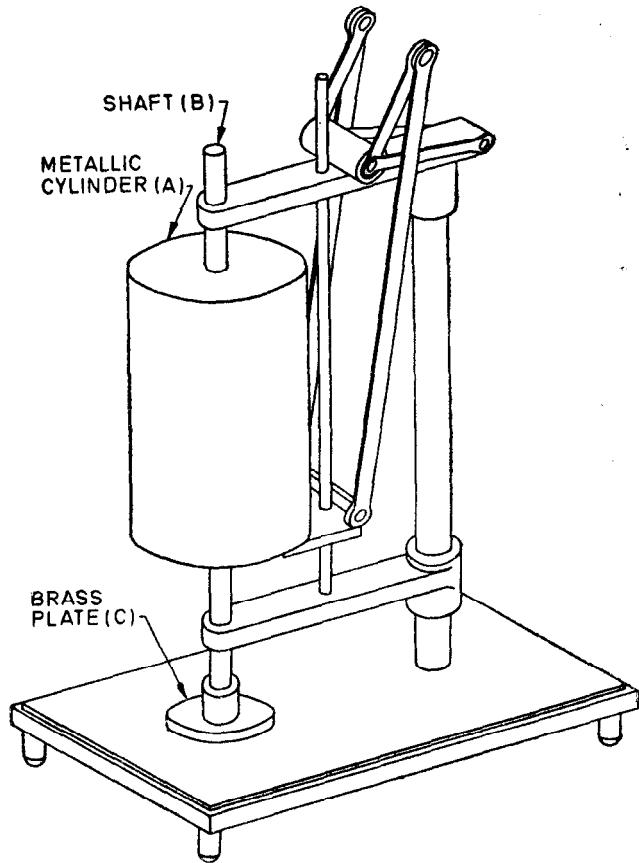


FIG. 1 FLOW TESTING INSTRUMENT

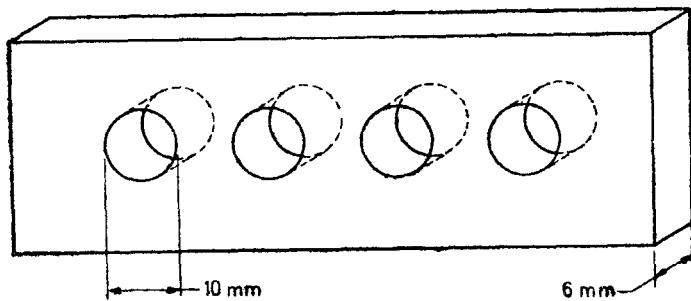


FIG. 2 MOULD FOR FORMING FLOW TEST SPECIMENS

A-1.3 Procedure — Measure the initial length of the specimen at $27 \pm 2^\circ\text{C}$ using the micrometer caliper. Make four measurements around the circumference and one measurement on the centre of the specimen. Record the average of the measurements to the nearest 0·005 mm. Place the specimen and the flow testing instrument in a water-bath and keep at the testing temperature for 20 minutes prior to testing. Control the temperature of the bath to within $0\cdot1^\circ\text{C}$ of the required temperature (use a calibrated thermometer for determining the temperature). Provide for agitation in the water-bath by means of a mechanical stirrer. Place a thin sheet of waterproof cellulose film between the instrument and each end of the specimen. The bottom of the specimen shall be 50 mm below the surface of the water in the bath. Apply a constant axial load of 19·6 N (2 kgf) to the specimen for 10 minutes, after which remove the specimen and cool in air to $27 \pm 2^\circ\text{C}$. Strip off the cellulose film and determine the final length in the same manner as the original length.

A-1.4 Expression of Results — Calculate flow, as evidenced by the change in length, as a percentage of the initial length. The value for flow at any temperature shall be the mean value for two specimens and shall be reported to the nearest 0·1 percent.

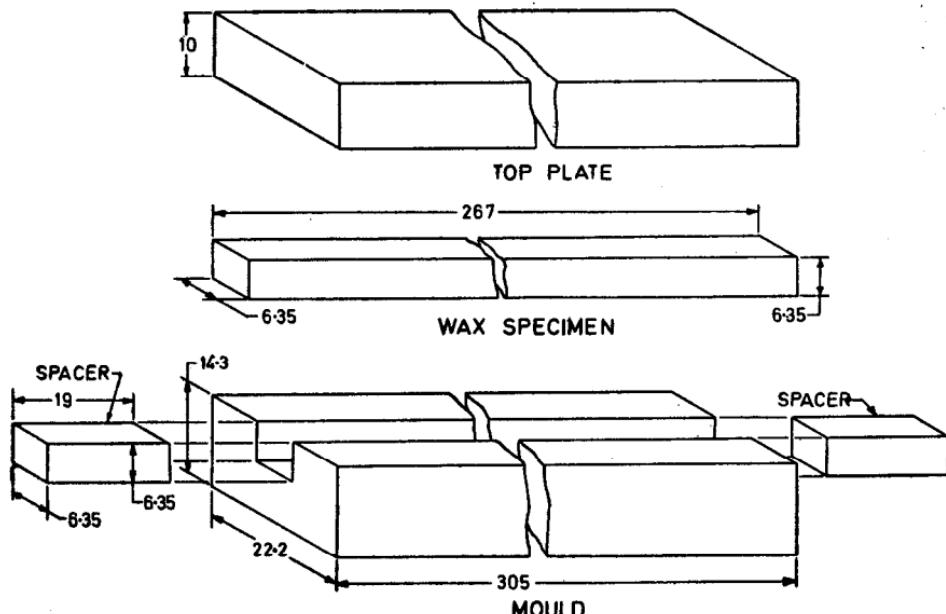
A-2. DETERMINATION OF LINEAR SHRINKAGE

A-2.1 Apparatus

A-2.1.1 Micrometer Microscope Comparator — or an equivalent instrument of equal accuracy.

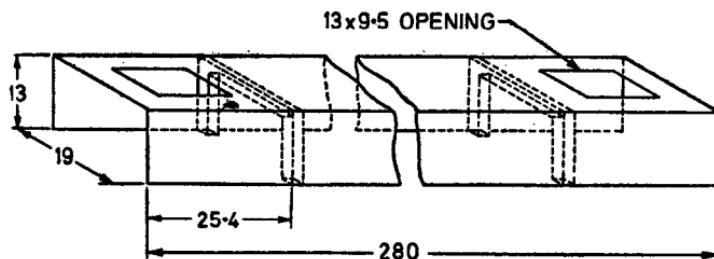
A-2.1.2 Brass Mould — 305 mm in length, having an opening of $6\cdot35 \times 6\cdot35$ mm running into full length, with spacers 19 mm in length, at each end (see Fig. 3).

A-2.1.3 Holder — As shown in Fig. 4. It has openings at the top for viewing the reference marks for linear measurements. These openings shall be located at 6·35 mm from each end of the holder and shall be $9\cdot5 \times 13$ mm in size. The holder is so constructed that the wax specimen rides against only two narrowed sections, having 8×8 mm openings, located 25·4 mm from each end, to enable alignment with a minimum of restraint to shrinkage during heating.



All dimensions in millimetres.

FIG. 3 BRASS MOULD



All dimensions in millimetres.

FIG. 4 HOLDER

A-2.2 Preparation of Test Specimens — Melt the wax as described in A-1.2 and pour into the brass mould, lubricated with a silicone grease whose melting point is higher than 80°C, until the mould is overfilled. Preheat the mould to $55 \pm 5^\circ\text{C}$. As the wax solidifies and shrinkage occurs, add the liquefied wax. When the wax has lost its mirror-like surface, place on top of the overfilled mould a lubricated brass plate, preheated to $55 \pm 5^\circ\text{C}$. Apply a load of 90 N (9 kgf) to the top of the brass plate for 30 minutes. Remove the mass and the brass plate and trim away the excess wax until the specimen is flush with the top of the mould. The size of the specimen thus prepared will be approximately 267 × 6.35 × 6.35 mm and is suitable for use with a micrometer microscope comparator. Remove the specimen from the mould and embed in its surface, near each end, small metal pins having cross marks which serve as reference marks for subsequent linear measurements. After preparing the test specimens store them at 37°C for 24 hours before testing.

A-2.3 Procedure — Not less than 24 hours and not more than one week after the preparation of the specimens, place the specimen in a water-bath maintained at a temperature of $45 \pm 0.1^\circ\text{C}$. At the end of 20 minutes, measure the length of the specimen and transfer the specimen forthwith to a water-bath maintained at a temperature of $30 \pm 0.5^\circ\text{C}$. At the end of 40 minutes, measure the length of the specimen again and express the change in length as a percentage of the length of the specimens at 45°C. The average of the values obtained on two such specimens shall be recorded as the linear shrinkage and shall be reported to the nearest 0.05 percent.

A-3. DETERMINATION OF NON-VOLATILE RESIDUE

A-3.1 Procedure — Place approximately 1 g of wax in crucible previously conditioned to constant mass by repeated heating to 500°C and cooling to room temperature. Place the conditioned, tared and loaded crucible in a furnace at room temperature. Increase the temperature of the furnace to 500°C and maintain at this temperature for 1 hour. Remove the crucible from the furnace, place in a desiccator, allow to cool to room temperature and then weigh. Carry out a duplicate determination.

A-3.2 Expression of Results — Calculate the mean value of two determinations and report to the nearest 0.02 percent.

A P P E N D I X B

(Clause 4.1)

SAMPLING OF DENTAL STICKY WAX

B-1. GENERAL REQUIREMENTS OF SAMPLING

B-1.0 In drawing, preparing, storing and handling test samples, the precautions and directions given in **B-1.1** to **B-1.5** shall be observed.

B-1.1 Samples shall not be taken in an exposed place.

B-1.2 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.3 To draw a representative sample, the contents of each container selected for sampling shall be mixed thoroughly.

B-1.4 The samples shall be placed in clean, airtight glass or other suitable containers.

B-1.5 Each sample container shall be sealed airtight with a suitable stopper after filling and marked with full details of sampling, the date of sampling and the year of manufacture of the material.

B-2. SCALE OF SAMPLING

B-2.1 Lot— All the containers in a single consignment of the material of the same form, size and belonging to the same batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture, the containers belonging to the same batch shall be grouped together and each such group shall constitute a separate lot.

B-2.1.1 Samples shall be tested from each lot separately for ascertaining conformity of the material to the requirements of the specification.

B-2.2 The number of containers (n) to be selected from the lot shall depend on the size of the lot (N) and shall be as given in Table 1.

B-2.3 The containers shall be selected at random from the lot and in order to ensure the randomness of selection, the random sampling methods given in IS : 4905-1968* may be followed.

*Methods for random sampling.

TABLE 1 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING
(Clause B-2.2)

LOT SIZE <i>N</i> (1)	NO. OF CONTAINERS TO BE SELECTED <i>n</i> (2)
Up to 50	3
51 to 200	4
201 „ 400	5
401 „ 650	6
651 „ 1 000	7
1 001 and above	8

B-3. TEST SAMPLES AND REFEREE SAMPLE

B-3.1 Preparation of Test Samples

B-3.1.1 Draw with an appropriate sampling instrument a small portion of the material from different parts of each container selected (see Table 1). The total quantity of the material drawn from each container shall be thrice the quantity required to conduct the tests for all the characteristics given under 2.

B-3.1.2 Thoroughly mix all portions of the material drawn from the same container. Out of these portions, equal quantities shall be taken from each selected container and shall be mixed up together so as to form a composite sample. The composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier and the third for the referee.

B-3.2 Referee Sample — The referee sample shall consist of a composite sample marked for this purpose and shall bear the seals of the purchaser and the supplier. It shall be kept at a place agreed to between the purchaser and the supplier and shall be used in case of dispute between the two.

B-4. NUMBER OF TESTS

B-4.1 Tests for all the characteristics given in 2 shall be conducted on the composite sample.

B-5. CRITERION FOR CONFORMITY

B-5.1 A lot shall be declared as conforming to this specification if the composite sample satisfies the requirements for each of the characteristics given in 2. If the requirements for any of the characteristics are not met, the lot shall be declared to have not satisfied the requirements of the specification.

**INDIAN STANDARDS
ON
DENTAL MATERIALS AND ALLIED PRODUCTS**

IS:

- 3571-1966 Dental gold solders
- 3578-1966 Dental gold alloy wire
- 3610-1966 Dental gold foil
- 4704-1968 Silver-tin dental amalgam alloy
- 4705-1968 Dental mercury
- 4799-1968 Dental casting gold alloys
- 5954-1970 Dental white gold alloys
- 6035-1970 Zinc phosphate dental cement
- 6036-1970 Alginate dental impression material
- 6037-1970 Zinc oxide-eugenol dental impression paste
- 6038-1970 Dental impression compound
- 6039-1970 Zinc oxide-eugenol dental cement
- 6043-1970 Copper phosphate — zinc phosphate dental cement
- 6555-1972 Dental laboratory plaster
- 6556-1972 Dental impression plaster
- 6884-1973 Dental silicate cement
- 6887-1973 Denture base polymer
- 6888-1973 Dental inlay casting wax
- 7225-1974 Dental cobalt chromium casting alloys
- 7348 (Part III)-1975 Glossary of terms relating to dentistry: Part III Dental materials
- 7425-1974 Dental casting investment for gold alloys
- 7966-1976 Dental modelling wax
- 8019-1976 Dental artificial stone
- 8020-1976 Baseplate, dental
- 8021-1976 Dental sticky wax
- 8022-1976 Acrylic resin teeth